Report

Training Needs Assessment of Health Workers on Health Care Waste Management in Kenya

For the project

Sound Chemicals Management Mainstreaming and UPOPs reduction in Kenya, Ministry of Environment and Natural Resources

October 2017

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EXECUTIVE SUMMARY

This report contains the results of an in-depth Training Needs Assessment (TNA) of Health Workers in the 4 project counties of the republic of Kenya – Nakuru, Kisumu, Nairobi and Bungoma. The assessment, facilitated by the UPOPs Project in close collaboration with the Ministry of Health and Ministry of Environment and Natural Resources, took place in the month of September 2017. This assessment focused on health workers at County and County referral health facilities.

A number of respondent groups were created, consisting of management and service providers from targeted health facilities. These respondent Groups were: SCHMTs, HFMC, Nurses, Doctors, Laboratory, Pharmacy, HCWM (Waste Management), casuals, waste handlers and incinerator operators. Senior Managers discussed the training needs for their respective departments, programmes and subordinates. For the remaining cadres and occupations, interviewer schedules and questionnaires was administered to obtain the relevant information. A total of 8 County and Sub county referral hospitals were visited within the project areas.

In determining the capacity/skill gaps, a distinction was made between competences and practices as documented in the main findings; None of the health workers, waste handlers and incinerator/autoclave operators have been trained on sound chemical waste management; with no knowledge on the multilateral agreements – Stockholm, Minamata, Basel and SAICM conventions. Tremendous gap exists on knowledge capacity of management of chemical waste – Mercury, Pharmaceutical, laboratory chemical waste and photochemical waste from radiology department.

Tier 5 hospitals have a waste management system entrenched in facility management waste quantification is being practiced with available budgets dedicated to waste management; Tier 4 health facilities require more technical support to establish the HCWM systems. Incineration is in use a major waste treatment method; however, the operating temperatures are below the recommended therefore a major source of PCDD and PCDF as listed in the 28 POP's by Stockholm convention.

Capacity building and training was identified as key gap in these health facilities to promote effective health care waste management of health care and sound chemical waste management. The health facilities require provision of color coded bins, liners and posters to streamline segregation. In order to mainstream chemical waste management there is need to expand the

segregation system as listed in the National Guidelines for Safe Management of Health Care Waste 2011 to incorporate chemical and pharmaceutical waste. In order to reduce the TEQ for PCDF and PCDD in the health facilities there is need for provision of cleaner technologies – Microwaving, Autoclaving and shredding and enhance the available incinerators for optimum functionality. Its therefore imperative to strengthen the HCWM systems at all these levels from organization, policy and planning; Training, Occupational health and safety, provision of HCWM Commodities – Bins, Liners, Waste transfer trolleys, PPE's for waste handlers, establish a Monitoring and Evaluation System. For sustainability financing systems should be established of Health care and chemical waste.

The recommendations from this TNA will form the basis for capacity building of health care workers on Sound Chemicals management and wastes (UPOPs). The MOH is set to take on a leading and coordinating role in realizing the training interventions outlined in this report.

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ACRONYMS

BAT – Best Available Technologies

BET – Best Environmental Technologies

CDC – Centre for Disease Control

CHMT – County Health Management Team

CME – Continuous Medical Education

FGD – Focused Group Discussion

GEF – Global Environment Facility

GOK- Government of Kenya

H/F's – Health Facilities

HMT's – Health Management Teams

I-RAT – Individualized Rapid Assessment Tool

JHPIEGO – Johns Hopkins Program for International Education in Gynaecology and Obstetrics.

JOOTRH – Jaramogi Oginga Odinga Teaching and Referral Hospital

KEPH – Kenya Essential Package of Health

KMTC – Kenya Medical Training College

MENR – Ministry of Environment and Natural Resources

MOH – Ministry of Health

MSDS -Material Safety Datasheet

NGO's – Non- Governmental Organizations

NIP – National Implementation Plan

PCB's – Polychlorinated Biphenyls

PCDF – polychlorinated dibenzofurans

PCDD – Polychlorinated dibenzo-p-dioxins

PGH – Provincial General Hospital

POP’s – Persistent Organic Pollutants

PPE - Personal Protective Equipment

SCHMT – Sub-County Health management team

SPSS – Statistical Package for Social Sciences

T2DM - Type 2 Diabetes Mellitus

TRFH – Teaching and Referral Hospital

HCWM – Health Care Waste Management

HCW – Health Care Waste

UNDP – United Nations Development Programme

UPOPS – Unintentionally Produced Organic Pollutants

WHO – World Health Organization

ACKNOWLEDGEMENT

Support from UNDP, the Programme Management Unit (PMU) – Ministry of Environment and Natural Resources of Mainstreaming Sound Chemicals Management and UPOPs Reduction, Ministry of Health Officials is esteemed for facilitating this needful assessment. Most importantly are the four counties; Nakuru, Kisumu, Nairobi and Mombasa and the Health facilities that participated in the needs assessments together with Hospital Management Teams (HMT's), Health workers, waste handlers and Incinerator Operators of JOOTRH, Ahero Sub County Hospital, Nakuru PGH Hospital, Molo Sub County Hospital, Mbagathi County Hospital, Mama Lucy Kibaki Sub County Hospital, Coast PGH and Port Reiz Sub County Hospital.

1 INTRODUCTION

1.1 Persistent Organic Pollutants and Health

Persistent organic pollutants (POPs) are organic compounds that are resistant to environmental degradation through chemical, biological, and photolytic processes which enable them to persist in the environment, to be capable of long-range transport, bio accumulate in human and animal tissue, bio accumulate in food chains, and to have potential significant impacts on human health and the environment. Many people are familiar with some of the most well-known POPs, such as PCBs, DDT, and dioxins. POPs include a range of substances that include: Intentionally produced chemicals currently or once used in agriculture, disease control, manufacturing, or industrial processes.

Nearly three-quarters of all non-communicable disease (NCD) deaths worldwide take place in low- and middle-income countries, according to the World Health Organization (WHO 2015). These 28 million deaths—from cancers, diabetes, and cardiovascular and respiratory diseases. In Kenya, it is estimated to be the second leading cause of NCD related deaths after cardiovascular diseases and accounting for 7% of overall national mortality.

Stockholm convention listed the 28 POP's that possibly effects on Human health in Article 5 Annex C; Polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans (PCDD/PCDF are generated from health care settings through incomplete combustion of health care waste containing plastics which are manufactured using PCDF. Most health facilities in Kenya use Incinerators for waste treatment therefore increasing the toxic equivalent of these POP's. Continuous exposure of Dioxins and Furans has been linked to cause cancers.

POP's have also been documented to cause diabetes. Type 2 diabetes mellitus (T2DM) is a major and fast growing public health problem. Although obesity is considered to be the main driver of the pandemic of T2DM, a possible contribution of some environmental contaminants, of which persistent organic pollutants (POPs) form a particular class, has been suggested. Several epidemiological studies have reported an association between persistent organic pollutants and diabetes risk. These findings have been replicated in experimental studies both in human (in-vitro) and animals (in-vivo and in-vitro), and patho-physiological derangements through which these pollutants exercise their harmful effect on diabetes risk postulated.

1.2 Institutional setup analysis

Kenya has ratified international treaties seeking to strengthen sound management of health care waste; Stockholm convention, Minamata Convention, Basel Convention and Strategic Alliance for International Chemicals Management under the World Health Organization.

1.2.1 International Conventions

Stockholm Convention

Kenya is a party to the Stockholm Convention on Persistent Organic Pollutants (POPs), having ratified the Convention in September 2004. The country subsequently developed its National Implementation Plan (NIP) in 2007. Through this process, Kenya developed and amended in a systematic and participatory manner, priority policy and regulatory reforms as well as capacity building needs and required investment programs for POPs since 2004.

Minamata Convention

In 2013 Kenya ratified the Minamata convention seeking to protect the human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds. The country seeks eliminate the use of mercury containing devices in the health sector in line with the Minamata Convention guidelines.

Strategic Alliance for International Chemicals Management

On May 30, 2017, the Seventieth World Health Assembly approved the Road map to enhance health sector engagement in the strategic approach to international chemicals management towards the 2020 goal and beyond. The road map identifies concrete actions where the health sector has either a lead or important supporting role to play in the sound management of chemicals, recognizing the need for multi-sectoral and multi-stakeholder cooperation. These actions are organized into four areas: risk reduction; knowledge and evidence; institutional capacity; and, leadership and coordination.

Basel Convention

The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, usually known as the Basel Convention, is an international treaty that was designed to reduce the movements of hazardous waste between nations, and specifically to prevent transfer of hazardous waste from developed to less developed countries (LDCs). The Convention is intended to minimize the amount and toxicity of wastes generated, to ensure their environmentally sound management as closely as possible to the source of generation, and to assist LDCs in environmentally sound management of the hazardous and other wastes they generate. Kenya ratified this convention in 2000.

World Health Assembly Resolution 50.13

In May 1997, WHO ratified the need to improve chemical safety and required members to involve appropriate health officials in national efforts to follow up and implement decisions of the UNEP and WHO governing bodies relating to the currently identified persistent organic pollutants; to ensure that scientific assessment of risks to health and the environment is the basis for the management of chemical risk and to continue efforts to establish or reinforce national coordinating mechanisms for chemical safety, involving all responsible authorities as well as the nongovernmental organizations concerned.

1.2.2 Kenya Waste Management Policy Environment Analysis.

The Kenyan health sector is committed to health care waste management; having developed a 5-year plan in 2015 and embedded waste management in the Kenya Health Sector Strategic Plan III outlining key priorities in healthcare waste management. In addition NEMA EMCA Act and National Solid Waste Management Strategy.

Kenya Healthcare Waste Management Plan, 2015-2020

In 2015, Kenya developed its 5-year strategic plan on health care waste; with 10 key indicators. Among them is increasing the number of trained workers from 23% to 68%; increasing the number of facilities with approved waste treatment technologies to 51%; and improving the availability of waste management commodities to 90%.

Kenya Health Sector Strategic Plan III, 2014-2018

The third Kenya's strategic plan outlines waste management as the role of both the National and County governments. That is liquid, solid and gaseous waste management as part of the Kenya Essential Package for Health (KEPH) Interventions. It outlines the role of the national government as capacity building the counties and providing technical support in line with County Government Act 2016.

KESH Policy

KESHP aims at improving medical waste management in all healthcare facilities and ensure compliance with the set regulations and standards. For the correct, efficient and effective management of healthcare/medical wastes in health facilities, county health departments and the responsible health facilities in collaboration with NESCRA, NEMA and other regulatory agencies.

2 OBJECTIVE AND SCOPE OF THE ASSESSMENT

2.1 Background

Kenya is categorized as a Lower Middle Income economy with a Gross Domestic Product (GDP) per capita of USD 1,338, approximately 45% of the population living on less than USD1.25 per day and a Human Development Index (HDI) of 0.509 in 2011 (UNDP, 2011). The economy grew by more than 7% per annum through 2007. The real GDP growth rate is expected to remain above 5% in 2014 - 2019.

Kenya is a party to the Stockholm Convention on Persistent Organic Pollutants (POPs), having ratified the Convention in September 2004. The country subsequently developed its National Implementation Plan (NIP) in 2007. Like other signatories to the Convention, Kenya completed the process of updating the NIP in accordance with the provisions of Article 7 of the Convention and in view of the amendments made to the convention since ratification. Through this process, Kenya developed and amended in a systematic and participatory manner, priority policy and regulatory reforms as well as capacity building needs and required investment programs for POPs since 2004. The process also enabled Kenya to establish inventories of products/articles containing POPs, industrial processes using them and to provide useful information on the concentration levels and distribution of POPs across the country.

Some of the POP's identified are from the health sector hence the need to manage the Unintended Organic Pollutants released from this sector as part of Health Care Waste management.

Substantial amount of regulation on HCWM is in force in the country, however the level of enforcement is very low. It has been very often observed that HCW is dumped or open burnt near the hospitals; which is the major source of Unintended Persistent Organic Pollutant's (UPOP's) in the health sector. Most of the available incinerators operate out of control without fulfilling the minimal operating temperature requirements for occupational and environmental safety. The HCWM Strategic plan estimated only 15% of health facilities in the county have treatment equipment (UPOP's Prodoc; HCWM strategic plan).

The Health Care Waste Management(HCWM) Strategic Plan 2015 -2020 estimates that 23% of health workers in Kenya are trained to effectively manage medical waste; this although does not include management of Chemical waste. An assessment of HCWM in 24 government health care facilities in Nairobi (Ngari W.N., University of Nairobi, 2011) found that

knowledge of the health workers on HCWM was inadequate to effectively manage healthcare waste.

2.1.1 Current Health Care Waste Management Training Set up

With the renewed efforts in tackling waste management in Kenya; one of the biggest gaps is the lack of training for health workers at training institution curriculums for Doctors, Nurses, Clinical Officers, Public Health among other key cadres in the health sector. The Kenya Medical Training Institutions (KMTC) have incorporated the training in their curriculum's in 2015. With the many health workers graduating from different training institutions this knowledge gap is enormous and hence the lack of consistency in healthcare waste management in the health facilities.

In 2015, the country developed a Training Guide for TOT's training and On Job Training (OJT) guide guided by the National guidelines on Safe Management of Health Care waste to aid in training health workers, waste handlers and Incinerator Operators at in service level. These trainings were rolled out by NGO's that supported trainings at the different counties, such as PATH, JHPIEGO and CDC supported partners.

2.1.2 Project Rationale and Policy Conformity.

The project is fully compliant with the Global Environment Facility (GEF5) Chemicals strategy objective 1 and 3 as it will support GEF intervention addressing POPs and U-POPs. In supporting sound chemicals management, it will in effect extend support to other chemicals of global concern beyond POPs in order to capture additional global environmental benefits.

The ultimate intention is to improve Kenya's compliance with the Stockholm Convention on Persistent Organic Pollutants, particularly as regards dioxins and furans. The project will support the GEF commitment to address air quality by avoiding emissions of POPs among other air pollutants such as greenhouse gases. Indeed, in Kenya, open burning of waste is the most used method of waste disposal though it is known to be a major source of UPOPs. The project is in line with the GEF global priorities related to the financing mechanism for the Stockholm Convention because Kenya, as a developing country, is eligible for this assistance. Further, the project is eligible in the context of the guidelines provided by the Conventions Conference of Parties (COP) such as it will:

1. Support implementation of the chemicals and waste multilateral environmental agreements and enable Kenya to fulfil its obligations under these agreements
2. Implement the commitments made at the 1st Session of the International Conference on Chemicals Management (ICCM1)
3. Develop and implement activities identified in the Kenya National Implementation Plan (NIP);

The project will support or promote capacity-building, including human resource and institutional development for both governmental and non-governmental institutions at both central and local levels.

3. PROJECT GOAL, OBJECTIVE, OUTCOMES AND OUTPUTS/ACTIVITIES

The Objective of the project is to "*Reduce the release of U-POPs and other substances of concern and the related health risks, through the implementation of environmentally sound management of municipal and healthcare wastes and of an integrated institutional and regulatory framework covering management of and reporting on POPs*."

The project intends to achieve this objective through improving the regulatory system, enhancing its enforcement, raising awareness on POPs, and by establishing the capacity for safe handling, transport and improved disposal of POPs-containing or POPs-generating waste. This will contribute to the reduction of risks for the human health and the environment by avoiding the release of POPs in the environment and preventing people's exposure to POPs.

The project encompasses five components (including Monitoring and Evaluation) as following:

Box 1: Project Components

Component 1. Streamlining sound management of chemicals and waste into national and county development activities through capacity building of MENR, MOH, county governments of Nairobi, Kisumu, Nakuru and Mombasa and the NGOs.

Component 2. Introducing environmentally sound management of health care waste in selected healthcare facilities; policy and strategic plans to prepare them to adopt BAT and BEP disposal.

Component 3. Demonstration of sound healthcare waste disposal technologies in a selected number of healthcare facilities in each county.

Component 4. Minimizing releases of unintentionally produced POPs from open burning of waste.

The government of Kenya is intensifying its efforts to manage health care waste in line with its international commitments Stockholm Convention, Minamata Convention, Basel Convention and SAICM. Currently the Sound Chemicals management and waste (UPOPS) project is being implemented by both the Ministry of Environment and Natural Resources and the Ministry of Health, funded from the Global Environment Facility (GEF) which aims to reduce the (Toxic equivalent (TEQ) that results from both municipal and health care waste and institutionalize sound chemical waste management in health care settings.

The project intends to protect human health and the environment by reducing / preventing the release of U-POPs and toxic compounds originating from the unsafe management of healthcare waste. It employs an integrated approach aimed at increasing the proper management of waste within the hospital facilities (increasing segregation, reducing waste generation) and by replacing the dangerous disposal waste modality currently adopted (open burning or burning in single chamber incinerators) by SC-compliant equipment. Training will be deliver both at HCF level and in classroom training events, and will be based on the WHO bluebook guidance tailored to the country needs.

4 OBJECTIVES OF THE TRAINING NEEDS ASSESSMENT

It is widely recognised that the outputs of informal and formal training activities will be enhanced by assessing the needs and the level of skills and knowledge of potential trainees before implementing any training. By knowing the principle job responsibilities of occupations, the expert competence analysis and the self-assessment of health workers, it becomes possible to tailor training activities to the relevant needs of the MOH, as well as to the needs of individual health workers. Furthermore, it becomes easier for the Ministry and their Development Partners to identify who should, and who should not participate in specific training courses and workshops. The anticipated gain of appropriate training are better motivated health workers and a thus a greater productivity of those workers which, in turn, benefits the entire health system and ultimately the patient, public health and the environment.

The primary focus of this training needs assessment is to determine the gap in capabilities of health workers in sound chemicals management and waste in the country to reduce the production of UPOPS in line with Stockholm Convention and validate the hypothetical judgment with actual training needs to ensure that solution addresses the most needed subjects and effectively focuses the appropriate resources, time and effort toward targeted solutions.

A training need exists when there is a gap between what is required of a person to perform competently and what he/she actually knows. A "training needs assessment", or "training needs analysis", is the method of determining if a training need exists and if it does, what training is required to fill the gap. The expectation of knowledge, skills and abilities of officials at different levels is different so their training needs are also different.

Training need assessment is to identify the gap between the model situation and the actual situation and the way in which it can be bridged. The gaps were identified and evaluated to determine the manner in which they could be bridged.

The results of training needs assessment will highlight the subject wise need to bridge the gap to help in the preparation of training modules and facilitate in the development of HCWM capacity building Plan.

Box 2. The reasons for doing training needs assessment is: -

- To determine whether any training is needed
- To determine the areas in which training is needed
- To determine the gap to be bridged
- To determine desired training outcomes

4.1 Time Period

The training needs assessment was conducted between August – September 2017

4.2 Phases in implementation

The following outlines the steps followed in conducting the assessment

- Development of an inception report and data collection tools
- Consultative sessions/meetings with PMU, UNDP and MOH
- Data Collection
- Data analysis and report writing.
- Presentation of findings to stakeholders
- Submission of final reports.

4.3 Dimensions of institutions examined (Tiers of H/Fs)

The Kenyan Health Sector facilities are segregated in Tiers. Tier 1 – 6. Tier 1- Dispensaries, Tier 2, Health Centers, Tier 3- Sub-County Hospitals, Tier 4 – County Hospitals, Tier 5- Referral Hospitals and Tier 6 – National Referral Hospitals. Due to the similar level of service (Tier) for these facilities selected for support by the project tier 3 and 4 levels, purposeful sampling was used to select facilities for the assessment. The table below shows the selected facilities per county representing 61% coverage of the project facilities providing representative finding.

Table 2: Health facility Selection

County	Name of Health facility	Tier
Nairobi County	Mbagathi Sub County Hospital	4
	Mama Lucy Kibaki Hospital	4
Nakuru County	Nakuru PGH Hospital	5
	Molo Sub – County Hospital	4
Kisumu County	Jaramogi Oginga Odinga Teaching and Referral Hospital	5
	Ahero Sub County Hospital	4
Mombasa County	Coast PGH Hospital	5
	Port Reitz Hospital	4

5 METHODOLOGY

5.1 Methodological Approaches

Human health and wellbeing is at the heart of global development agenda and is contributed to through Sustainable Development Goals (SDGs) Goal 3 – Good Health and Well Being. The WHO Blue Book is the global benchmark against which all countries develop their health facility management and healthcare provision frameworks. The national framework towards realizing these benchmarks consists of National Guidelines for Safe Management of Health Care Waste 2011, Health Care Waste Management SOP's, NEMA - Waste Management Regulations 2006. The Kenya National Guidelines for Safe Management of Healthcare Waste 2011 was the most relevant benchmark for this study. The provisions in the Kenyan Guidelines and WHO Blue Book was the basis of the gaps analysis conducted under this study.

5.2 Key assessment questions

In documenting the training needs of the Kenyan HCW management gaps in knowledge, attitude and practice at health facilities, answers to the following key questions were sought:

1. What are the knowledge gaps among the HMT and staff in sound management of chemical and healthcare waste?
2. Do the current practices conform to the National Guidelines for safe management of healthcare waste and the WHO book?
3. What are the capacity building needs and equipment's required to safely manage health care and chemical waste generated in health facility?

5.3 Data Collection Tools

Three data collection methods were used in conducting the needs assessment: Focus Group Discussion (FGDs), the WHO individual rapid assessment tool (IRAT) and individual questionnaires. The summary of the methods are as follows and Table 3 is the sample frame:

a) ***Focus Group Discussions (FGDs) –*** were conducted with the respective facility management team and was used to collect data on the facility waste management status and workers capacity gaps to effectively undertake the recommended waste management procedures; all the FGD sessions were recorded using a recorder for transcription (Annex 1 is the FGD guide for facility management consultations)

b) ***WHO IRAT Tool*** - was used to gauge facility current practices in waste management. It was a self-administered questionnaire to the nursing Officer In-charge, Hospital Administrator and Public Health Officer. (Annex 1 –Excel sheet)

c) ***Individual structured questionnaires*** – were targeted at individuals in the nursing, doctors, public health officers, biomedical engineers, clinical officers, radiographers, laboratory technicians, waste handlers and incinerator operator's cadres.

The sample frame for the data collection was as follows:

Table 3: Response rate

Tool	Target	No. Achieved	Response Rate
I-RAT Tool	8	8	100%
FGD	8	7	88%
Health Worker Interviews	96	80	83%
Waste Handler Interviews	16	16	100%
Incinerator Operator	8	8	100%

5.4 Data Analysis

Individualized Rapid Assessment Tool (I-RAT) generated charts on the 16 domains assessed. Results from IRAT were triangulated with the information from the FGDs and observations during the facility visit. FGDs data were analyzed using quantitative thematic analysis to generate thematic areas of discussion. Statistical Package for Social Sciences (SPSS) was used to analyze the data from responses to the structured questionnaires.

6 TRAINING NEEDS ANALYSIS

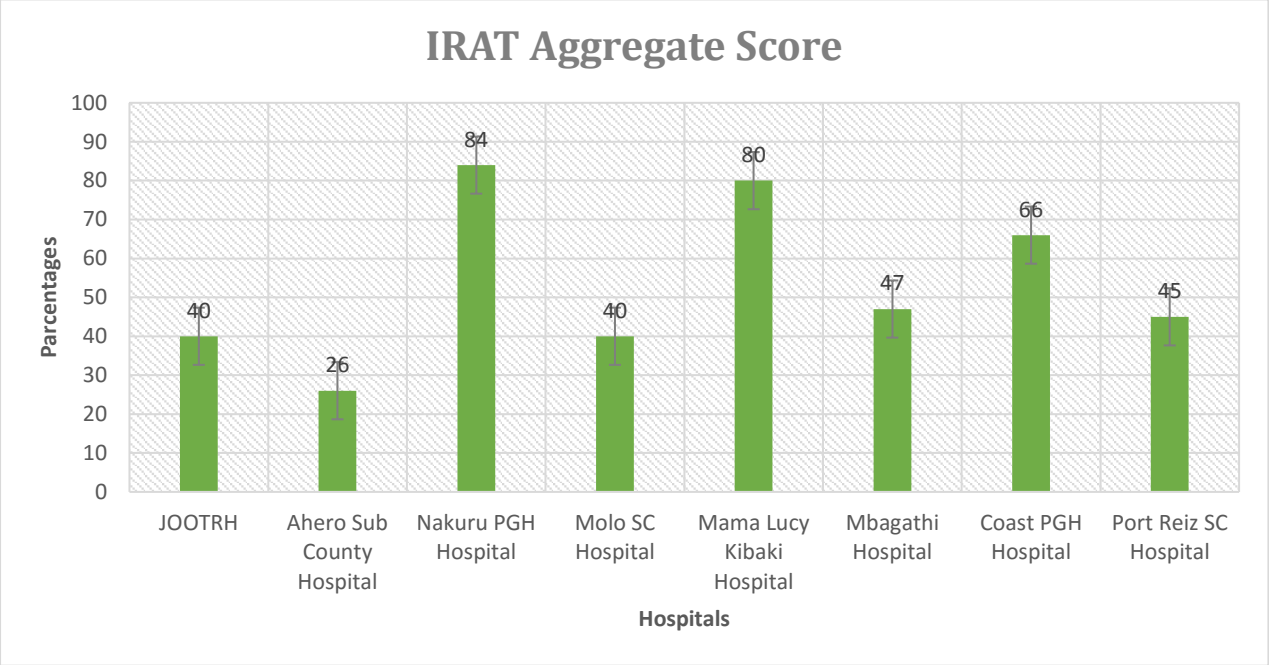
6.1 Introduction

The WHO I-RAT was the main tool used to evaluate the hospitals current practices on the 16 domains, some of which have a bearing on the facilities HCW management capacity. The 16 domains are;

1. Organization,
2. Policy and planning,
3. Training,
4. Occupational health and safety,
5. Monitoring and evaluation,
6. Financing,
7. Waste segregation,
8. Waste generation data,
9. Collection and Handling,
10. Colour coding and labelling,
11. Posters and signage,
12. Internal transportation,
13. Storage,
14. Hazardous, chemical, pharmaceutical and radioactive waste management,
15. Treatment and disposal and
16. Waste water.

The 16 domains assessed is used to gauge the availability of heath care waste management systems in hospitals. Overall the level 5 health facilities have an established system of Health Care waste management entrenched to facility management with scores ranging 60-80%. The chart below summarizes the scores form the 8 facilities visited

Chart1: I-RAT Aggregate scores per facility



6.2 Current Health Care Waste Management Practices

6.2.1 Organization, Policy and Planning

The WHO Blue Book and the Kenya National Guidelines for Safe Management of Healthcare Waste 2011 both require every hospital to have:

- ✓ A designated person responsible for waste management in the hospital;
- ✓ A committee to oversee waste management activities (Infection Prevention (IPC); or
- ✓ A health care waste committee together with all staff in hospital understanding the roles in waste management.

All the facilities visited had an overall person in charge of waste management – the public health officer; however only 37% (3) had committee to oversee waste management activities, all staff were also indicated to understand their roles although the roles are not very clear since only 39% (43) of the health workers had been trained on waste management.

Table 4: Organization, Policy and planning

Health facility	Designated Person (Yes/No)	Infection Prevention Committee (IPC) (Yes/No)	Health Care Waste Plan (Yes/No)
Mbagathi SCH	Yes	Yes	Yes
Mama Lucy Kibaki Hospital	Yes	No	No
Nakuru PGH	Yes	No	Yes
Molo SCH	Yes	No	No
Jaramogi Oginga Odinga TRFH	Yes	Yes	Yes
Ahero SCH	Yes	No	No
Coast PGH	Yes	Yes	No
Port Reitz Hospital	Yes	No	No

Planning for HCW in health facilities is critical in ensuring proper waste management. The National Guidelines on HCW require each facility to have a health care waste management plan detailing the procedures of management of different waste streams in accordance to the national laws and safeguarding the environment. The plans should detail the facility's commitment, roles and responsibilities for each cadre, estimation of key HCWM commodities and Personal Protective Equipment (PPE), waste quantification and budgeting. Three (3) of the assessed hospitals had a waste management plan, however the plan had not been revised to suit current developments in these hospitals such as management of cytotoxic, radioactive and pharmaceutical waste management.

6.2.2 Training

The WHO Blue Book recommends that hospital personnel, including senior medical staff and managers, be able to communicate the benefits of HCWM. They should be prepared to undertake training and be convinced of the health, occupational safety, economic,

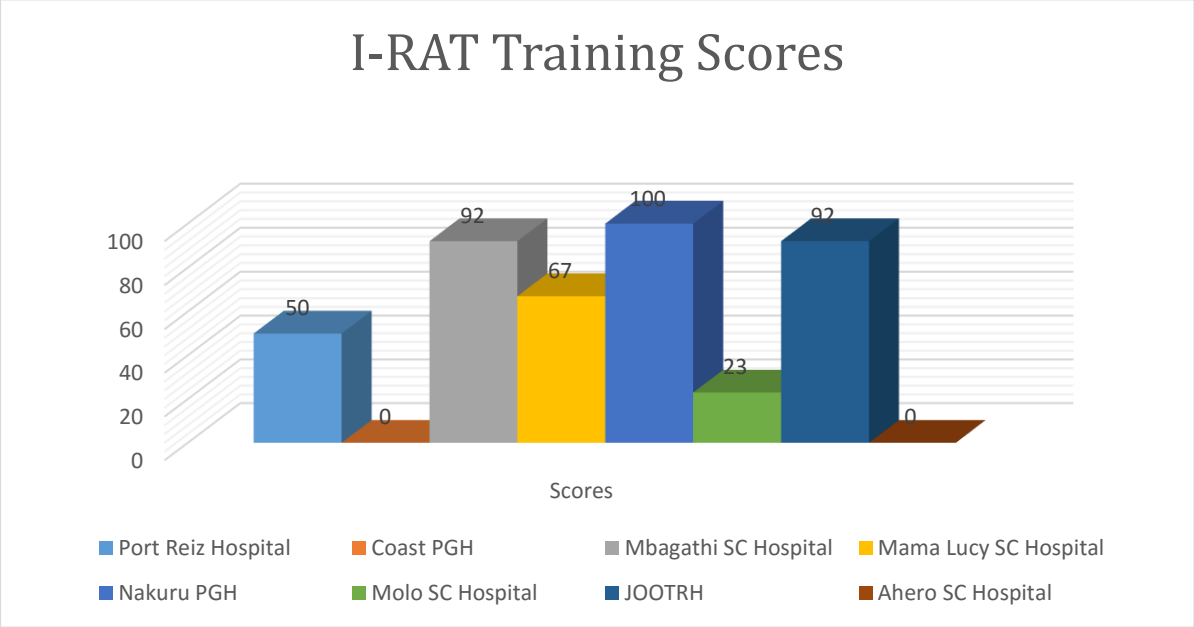
environmental and regulatory advantages. Achieving this outcome strengthens the participation and collaboration of other personnel in training activities. Separate training activities can be designed for different categories of health care personnel: these are mainly in two categories of hospital managers and administrative staff responsible for implementing regulations on HCWM and those who handle waste such as medical doctors, nurses, nursing assistants and allied professions, cleaners, porters, auxiliary staff and waste handlers.

The National guidelines on safe management of HCW require only technically trained persons be deployed in HCWM. The Hospital Management is required to facilitate education and training at the levels of health care workers - facility managers, health care workers, waste handlers and treatment equipment operator's training together with conducting public awareness and behavior change communication (BCC). The guidelines also recommend Continuous Medical Education (CME's) and professional development to address the performance gaps by use of tools e.g. supervisory check list. The Health Facility Management Team (HMT) is required to facilitate refresher training after critical review of existing waste management practices, i.e. segregation, storage, collection, transport, treatment and disposal and develop/adopt and disseminate guidelines on Standard Operating Procedures to Health Care Workers, waste handlers and community.

The Ministry of Health developed the Training Guide for Trainer of Trainers (TOT's) on HCWM and On Job Training Guide for Health Workers, Waste handlers and Incinerator Operators in 2015. Different actors have rolled out these trainings at different levels especially the NGO's working in Care and Treatment Programmes. The training guides however do not include content on sound chemical waste management in line with both Stockholm and Minamata Conventions and SAICM.

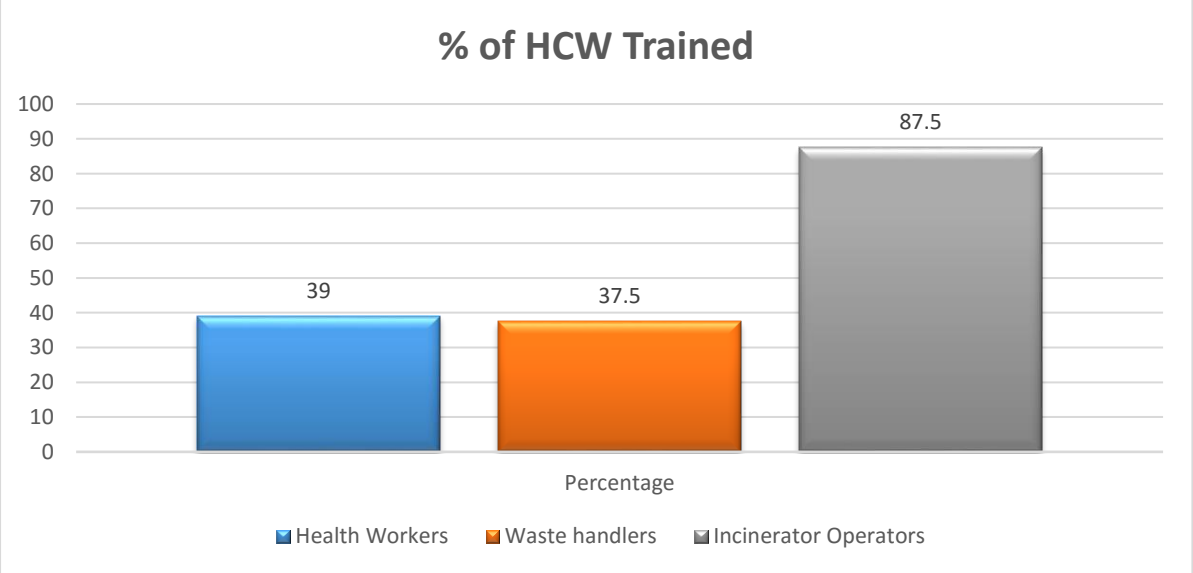
Proper waste management requires skill sets from minimization, segregation, transportation, collection handling and treatment to disposal. The assessment scores on training ranged from high to low in Tier 5 health facilities and Tier 4 health facilities this was due to previous trainings held by PATH and National government at Tier 5 health facilities.

Chart 2: Training Scores



From the individual questionnaires; 39% of health workers, 37.5% waste handlers and 87.5% incinerator operators of the respondents had been trained on waste management. This training was mainly conducted in-house, 85% (94), but did not include management of chemical waste. Amongst the respondents who had been in service in the last 5 years, 66% of indicated they had been trained compared within that period.

Chart 3: Percentage of trained workers at health care facilities per cadre



Whereas the national HCW Plan training target of 68% is close to being achieved, the cadres of health workers and waste handlers trained is just above the target. For sound HCWM practices there is still need for training of all cadres but available resources would best be targeted training the cadres who are still below the national target. This may be achieved more by inclusion of the trainings in the institutional curriculums and roll out of in-service trainings to have a critical mass with knowledge. Behavior Change and Communication Strategies will also be incorporated to the in-service trainings.

6.2.3 Occupational Health and Safety

All HCW is considered hazardous and therefore maximum precaution must be taken in its handling. The National Occupational Health and Safety Guidelines and National Guidelines on safe management of HCW require all health workers, waste handlers and incinerator operators be sensitized on their occupational exposures when handling waste, provided with occupational vaccination and made to understand the universal precaution procedures. Of the respondents, 37.5% (8) of incinerator operators and 31.2 %(16) of waste handlers had PPE for performing their respective duties though and worn out requiring replacement. Mortuary attendants in all the sites did not have the required PPE for handling formaldehyde and symptoms of chemical exposure was evident in their hands and eyes.

Occupational vaccination of Hepatitis B is mandatory requirement for personnel working in the health sector. 90 %(99) of the respondents interviewed have not been vaccinated against Hepatitis B of these 60 %(66) have had 2 doses and therefore incomplete vaccination. None of the waste handlers or incinerator operators had been vaccinated.

Needle stick injuries is one of the top occupational hazard the waste handlers and incinerator operators are exposed to. 31 %(4) of waste handlers and 25 %(2) of Incinerator operators reported to have had a needle stick injury while performing their duties. When asked what immediate action the took after a needle stick injury, only 30%(8) understood the recommended immediate action of washing in running water without squeezing and reporting to supervisor as stated by the national and WHO guidelines.

Training on Occupational Health and Safety, occupational vaccination and universal precautions is required to ensure all the hospital workers manage the occupational risks as required by the Occupational Health and Safety Guidelines 2014.


Incinerator operator and Cleaner /waste handler at Nakuru PGH

6.2.4 Waste Segregation.

The Kenya National Guidelines on Safe Management of Healthcare Waste requires that waste be segregated as per hazardous content. The guidelines outline a 6-bin segregation system for the different waste generated in the facility as shown in the chart below.

It's the responsibility of the waste producer to segregate as close as possible to the place at which the waste is generated. Waste segregation should be maintained in storage areas, during transportation, treatment and disposal.

The main segregation system being used at in the Kenyan health facilities is the 3 bin system: Red for pathological Waste, Yellow for Infectious Waste and Black for non-infectious waste. From the assessment waste segregation is still a challenge among the health workers. Chart 4 below are the comparative scores on training, segregation and hazardous, chemical, pharmaceutical and radioactive waste management. All facilities experienced challenges with waste segregation; observations showed mixing of general and infectious waste in some areas including inadequacy of bins and matching liners.

Table 5: Waste segregation categories

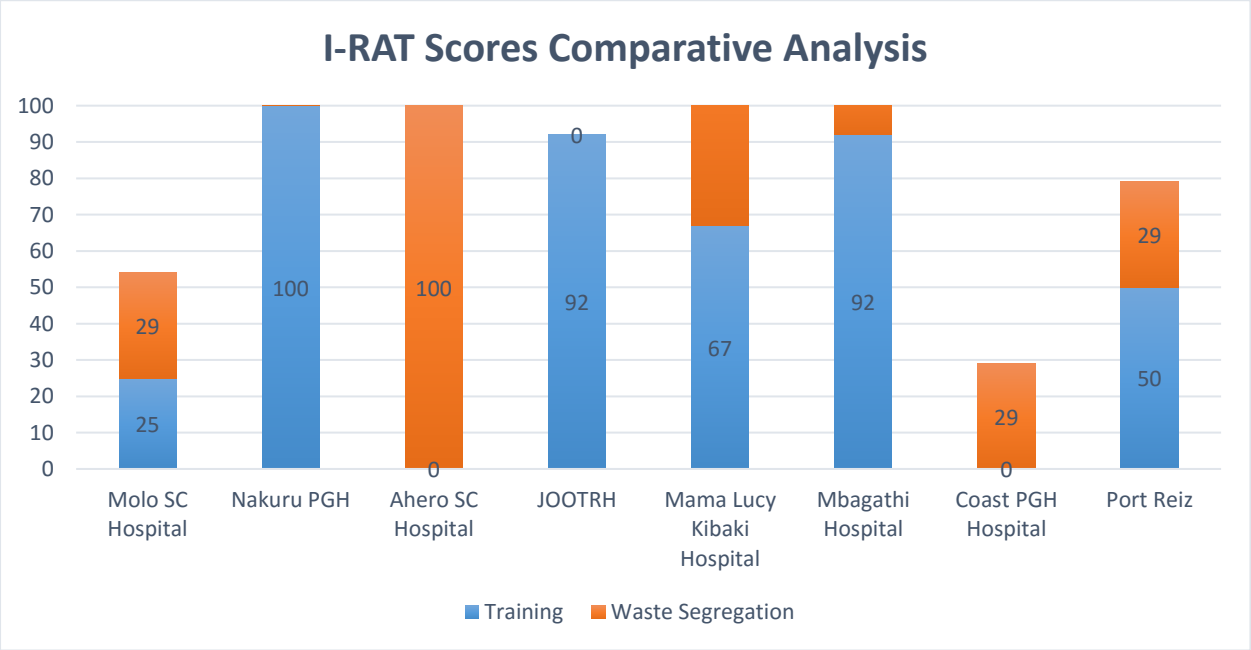
Category	Examples of Wastes	Color of Bin and Liner	Marking
General or non-infectious	Paper, packaging materials, plastic bottles, food, cartons	Black	No recommended marking
Infectious	Gloves, dressings, blood, body fluids, used specimen containers	Yellow– pedal action	
Highly infectious or anatomical/ pathological	Laboratory specimens and containers with biological agents, anatomical waste, pathological waste	Red-pedal action	
Chemical	Formaldehyde, batteries, photographic chemicals, solvents, organic chemicals, inorganic chemicals	Brown	Marking will vary with classification of the chemical
Radioactive	Any solid, liquid, or pathological waste contaminated with radioactive isotopes of any kind	Yellow	
Genotoxic/ Cytotoxic	All drug administrative equipment (e.g. needles, syringes, drip sets), gowns and bodily fluid/ waste from patients undergoing cytotoxic drug therapy	Purple	
Sharps Box (Safety Box)	Needles, Syringes, broken vials	White/yellow safety boxes (WHO Approved)	

Source HCWM SOP's 2015

http://www.moh.gov.rw/fileadmin/templates/Docs/National_20Health_20Care_20Waste_20Management_20SOPs-2.pdf

Waste segregation Bins at Molo SC hospital Mixed waste

Chart 4: I-RAT Score Comparative Analysis- Training, Waste Segregation and Management of Hazardous Waste



Some of the health facilities that are training institutions have a high turnover of staff and hence experience diminishing consistency of practice.

With devolution of health services, training is required to ensure segregation is maintained at all levels together with introduction of segregation of other types of waste, pharmaceutical, chemical and radioactive waste which are currently not being practiced in health facilities.

> "Our *hospital receives batches of interns and students on attachment every 3 months; with the lack of scheduled orientation, they end up mixing waste*".
>
> R3- Coast PGH Hospital

6.2.5 Color-coded Bins and Liners availability

The WHO Blue Book and National Guidelines for safe HCWM requires health facilities to maintain waste segregation at all levels. Bins and liners are main equipment requirements to aid waste segregation at source. The bins and liners should maintain the color coding system and have the biohazard mark relevant to the type of waste in accordance to Kenya HCWM Commodity Specifications 2013.

From the assessment 81 %(7) of the hospitals had color coded bins for waste segregation, with the exception of Ahero Sub County Hospital. However only 24 %(2) had matching color coded liners. Some of the respondents suggested that the non-matching color-coded bin and liners contribute to mixing of waste.

All health facilities are required to acquire the color-coded bins and liners in as the basic compliance to the WHO and national standards of HCWM.

6.2.6 Quantities of Infectious Waste Generated

Waste quantification is an important step in waste management as it enables the planning and proper management of the waste value chain. WHO recommends that each health facility quantifies the amount of waste it generates to monitor segregation and aid in budgeting for waste management. It also recommends a generation rate of 0.5kg of infectious waste per bed per day, while the National Guidelines of Safe HCWM estimate up to 20% of hospital generated waste in Kenya to be infectious.

Five (5) of the 8 hospitals visited quantify the waste generated, with infectious waste ranging from 34 - 68% of the total waste generated; way above the national recommended levels of 20%. The table xxx shows the amount of infectious waste generated in the 5 health facilities.

Table 5: Quantities of waste generated in Nakuru PGH, JOOTRH, Mbagathi, CPGH and Port Reitz Hospitals

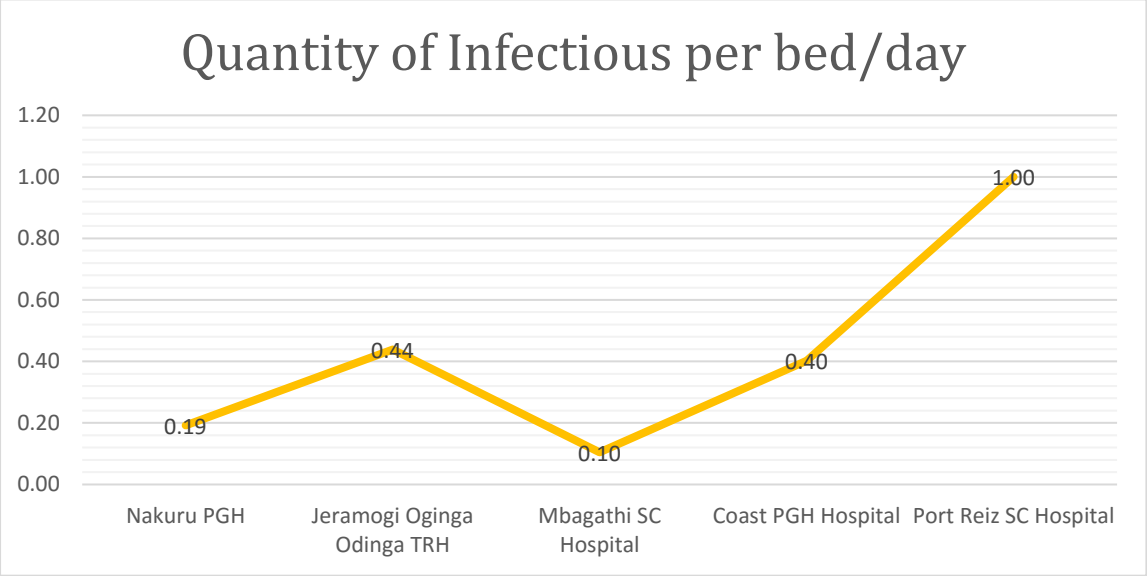
	Nakuru PGH	JOOTRH	Mbagathi	Coast PGH	Port Reitz
Total Waste Generated (Kgs/day)	350	300	94	350	200
Infectious Waste (Kgs/Day)	120	120	64	200	120
Percentage Composition of infectious waste (%)	34%	40%	68%	57%	60%

Although most facilities indicated that the health workers were trained on waste segregation, the findings on the proportion of infectious waste as illustrated in Table 5 alludes to the mixing of waste in most facilities. Therefore, there was no correlation between training and practice, an example is Mbagathi SC Hospital that indicated most staff have been trained on waste management (92%) yet the proportion of infectious waste was 68% from the waste generation data at the incinerator, 48% above the national guidelines estimate.

6.2.7 Infectious waste generated per bed.

WHO recommends a waste generation rate of 0.5kg of infectious waste per bed per day. An analysis of the waste data in the 5 health facilities keeping records on waste indicate a range of 0.2 -1 kg/bed per day considering the occupancy rate.

Chart 5: Infectious waste per bed/day



6.2.8 Posters and Signage

The National Guidelines on HCW requires each segregation point to have posters and signage i.e. waste segregation charts which act as reminder for health workers on placement of healthcare waste generated. All the facilities visited (8) did not have the recommended segregation charts placed at the segregation points.

The segregation charts should be provided and put up at designated waste receptacle and management points at the health facilities to aid proper waste segregation in conformity to the national standards.

6.2.9 Collection and Handling

Infectious waste should be collected daily from the waste generation point; or at least 2 times in a busy area or when full as per the National Guidelines for Safe HCWM. All the facilities assessed had their waste collected daily except for the safety boxes which were collected when ¾ full or after one week as per national guidelines. At three facilities, Port Reiz, Ahero and Molo SC hospitals safety boxes stayed for more than one week exposing the health workers and waste handlers to risks of needle prick injuries if stored in wet surfaces and infections.

6.2.10 Internal Transportation and Storage

WHO and national guidelines on HCWM requires that all HCF should conduct a review to optimize the waste collection process, reduce handling and transportation, and to promote safe work practices; use of color coded trolleys to maintain segregation during waste transportation.

Transportation routes should avoid where possible food preparation and heavily used areas and waste must not be stored in the interim storage for more than 12 hours.

All the eight (8) facilities assessed did not have a clearly defined system of internal transportation, had no waste transportation trolleys but used wheelbarrows with no segregation maintained. All the facilities removed the waste within 12 hours but did not have designated interim storage areas in the waste generation areas.

6.2.11 Hazardous, chemical, pharmaceutical and radioactive waste management

WHO blue book, Waste Management Regulations 2006 and National Guidelines on HCWM requires that various chemical and pharmaceutical wastes be segregated and collected separately: subcategories include mercury, batteries, cadmium-containing wastes, photochemical, stains and laboratory reagents, cytotoxic drugs and other pharmaceuticals. All should be clearly labelled with the type of waste and the name of the major chemicals, with any necessary hazard labels attached to corrosive, flammable, explosive or toxic chemicals. Liquid chemical wastes should never be mixed or disposed of down the drain, but should be stored in strong leak-proof containers. It may be possible to recover silver from photochemical at a profit, and return of chemicals to suppliers should be practiced where possible. Silver is increasingly used in medical products, but is rarely segregated due to a lack of dedicated disposal or metals recovery facilities. Low-energy light bulbs (compact fluorescents) contain small amounts of mercury. Both these and batteries should be segregated and treated by recycling processes, where suitable facilities exist (WHO).

> *"Few years ago, we used to have people coming to buy the solution for silver recovery, however nowadays we do not see the around and we have no option but drain to the sewer"*.
>
> R4 Molo and Nakuru PGH hospital

6.2.12 Photochemical waste

Current imaging technology in the market is digital. 50% (4) of the health facilities visited still used fixes and developer solutions for processing films at the radiology departments generating

> *"Although we have been moving our imaging to digital, we sometimes still use the fixers and developers, we currently store the liquid in 20-liter jerry cans once full we store them as we await next action plan; if we don't get we shall drain to the drain"*
>
> R5: Coast PGH Hospital

photochemical waste. All these facilities did not segregate, label or have an approved method of disposal of the liquid waste: they currently dispose to the drainage system due to lack of alternatives for recovery.

6.2.13 Mercury

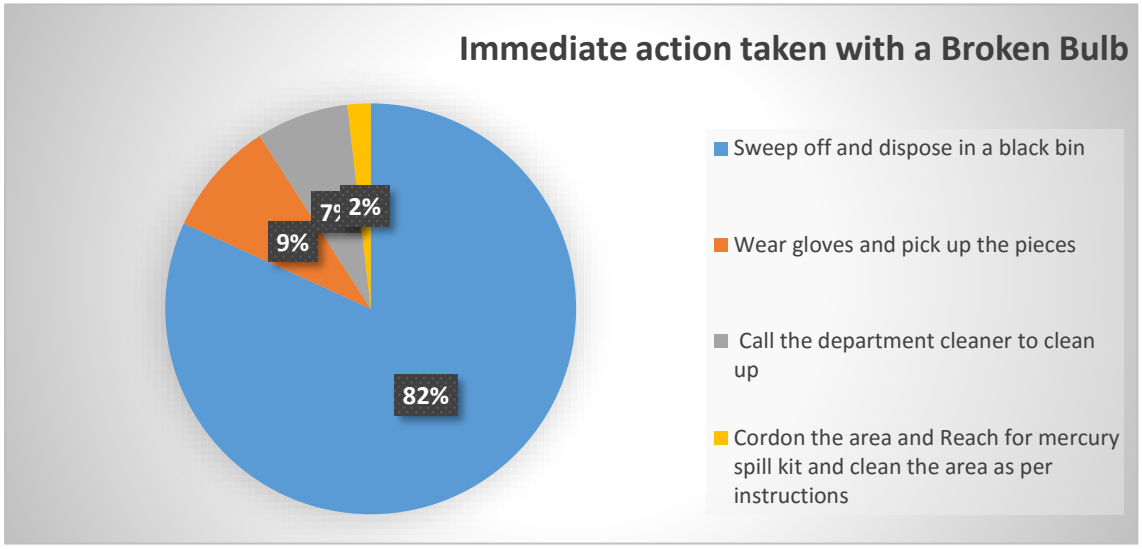
Mercury use is being reduced in health care and other applications around the world because of its toxicity and pollution potential. Since it is volatile, spilled mercury can be inhaled by staff and patients if it is not cleaned up properly. A simple spill kit can be cheap and effective. Where mercury thermometers and sphygmomanometers are still in use, medical staff should be supplied with a spill kit and trained its use. Any spill larger than a thermometer should be dealt with in consultation with the local health and safety authority. Brushes and vacuum cleaners should never be used for spilled mercury. Mercury can be cleaned up easily from wood, linoleum, tile and similar smooth surfaces. It cannot be completely removed from carpets, curtains, upholstery or other absorbent materials (WHO).

The Kenya chemical profile links mercury exposure to mottling of teeth as observed in central Kenya and Elemental and methylmercury are toxic to the central and peripheral nervous systems. The inhalation of mercury vapor can produce harmful effects on the nervous, digestive and immune systems, lungs and kidneys, and may be fatal.

All the HCF's visited still had Mercury containing devices – Blood Pressure (BP) machines and thermometers but had no knowledge of its management, storage and disposal. Majority of the facilities incinerate/burn amalgam waste from dental department. BP machines and thermometers are incinerated except in Coast PGH where they recover mercury and store in a container. All the 8 hospitals (100%) have piles of fluorescent tubes stored at the maintenance department; however, at Mama Lucy Hospital they incinerate broken or non-functioning fluorescent tubes releasing mercury vapors to the air.

Chart 6 is a summary the responses on where the facilities disposed of a broken bulb. The responses implied the lack of knowledge on mercury containing devices indicative of the knowledge gap and need for capacity building.

Chart 6: Immediate action taken with Broken Bulb



6.2.14 Laboratory Chemical Waste

It was observed that health facilities struggle to dispose of expired chemicals in the laboratory. 80% (6) of the laboratories visited had biosafety cabinets expired chemicals in the HCF's were stored. However, these did not conform to requirements for the separation by content, reactivity or toxicity, the storage areas were also not secured and outside the laboratory, made of non-corrosive material and there were no labels on the containers as recommended by WHO.

> *"We have chemicals which are more than 20 years old, we do not know what they are and do not know what to do with them"*
>
> R 2 Nakuru PGH

Expired chemicals at Port-Reitz Hospital

6.2.15 Pharmaceutical Waste

Pharmaceutical waste comprises of all expired drugs, syrup, tablets, gels and infusion liquids. Kenya National Guidelines on Safe HCWM requires pharmaceutical waste to be segregated in brown bin and liner and disposed-off using the Material Safety Data Sheets (MSDS) recommendation. 100% (8) of health facilities assessed do not have designated segregation and treatment methods for pharmaceutical waste they incinerate /open burn the expired drugs. Other facilities have piles of drugs stored awaiting disposal such as Nakuru PGH and Port Reitz Hospitals. The wastes are lumped in stores with no plan of disposal.

> "*We usually throw in the open pit and burn with other wastes*"
>
> R 5 Molo SCH.
>
> "*There are tons of narcotic drugs in one store; I found them here when I reported in 2012 and I do not know what to do with them*"
>
> R7 Nakuru PGH

6.2.16 Monitoring and Evaluation

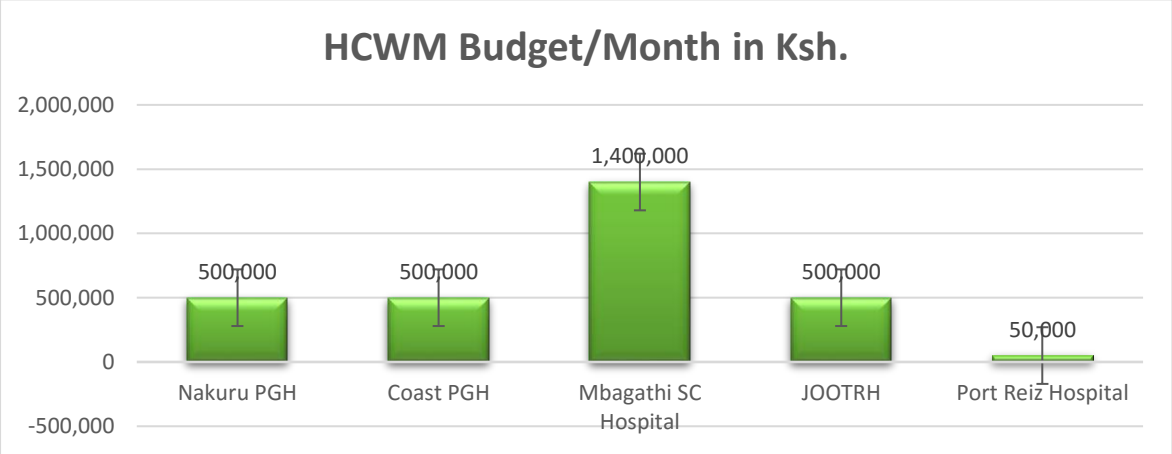
HCF's having a monitoring and evaluation system for HCW ensures the practices conform to the national guidelines and standard operating procedures (WHO). Three (3) of the facilities visited – Coast PGH, JOOTRH and Nakuru PGH indicated they had monitoring systems that ranged from monthly and quarterly assessment of their HCWM. However, corrective action was not undertaken immediately and these facilities have never reviewed their waste management plans as required by the National Guidelines and WHO.

6.2.17 Financing

All health facilities are required to cost healthcare waste management processes – both direct/capital costs and operational costs outlining guiding principles for budgeting of health care waste; staff costs, bin and bin liners supply, PPE and waste trolleys supply, legal and regulatory licenses and audits. (WHO)

Five (5) out of the eight facilities visited have a lump sum budget for healthcare waste. The budget is majorly used to procure bin liners and fuel for the incinerators. This does not include Human resource costs, purchase of PPE for waste handlers and environmental protection costs, spill kits, disposal costs and color coded bins. No facility has a long term mechanism to sustain financing of health care waste activities in these hospitals such as budget code or income generating activities (IGA) such as providing centralized treatment facilities hence the need for capacity building. The chart below shows monthly allocations for health care waste in the 5 health facilities.

Chart 7: HCWM Budgets per Month



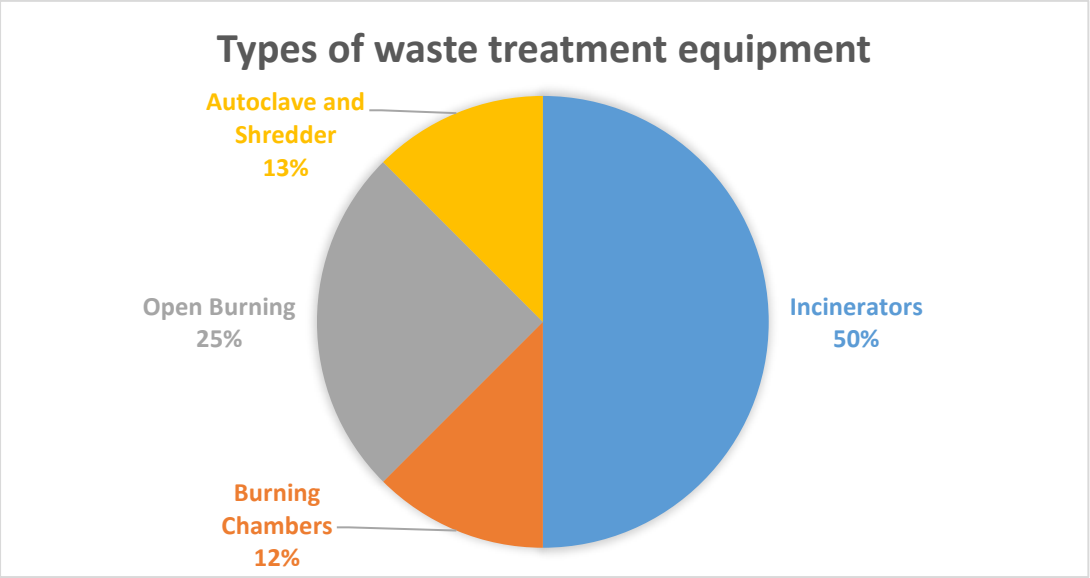
6.2.18 Waste Treatment and disposal

Although Incineration is the major type of technology used in Kenya for waste treatment; WHO recommends that health facilities should adopt cleaner technologies of treating and disposal of waste such as microwaving, autoclaving and shredding.

Of the eight facilities assessed, one health facility uses non-burn technology, autoclave and shredder (Coast PGH). Four health facilities had incinerators, one used burning chamber and the other open Burning (Molo SC Hospital).

The chart below shows the different treatment systems available.

Chart 8: Type of Waste Treatment Equipment Available



Seven of the incinerator operators specified having been trained on operation of the treatment equipment available in the facility. However, on observation of the process of incineration at the site, no preheating of primary chamber was done before burning, operating temperatures at both primary and secondary chambers were below 850^0C and 1100^0C respectively. An example in Mbagathi hospital, primary chamber was set at 500^0c and secondary at 1000^0C and also at Mama Lucy Kibaki Hospital primary chamber was at 700^0C and 100^0C in secondary chamber. Burning waste at these temperatures is a major source of UPOP's and release of dioxins and furans including from open burning as stated in the Stockholm convention- Guidelines on Open Burning.

The non-burn technology consisting autoclave and shredder at Coast PGH is operated as per the SOP's on site. However, routine tests – chemical tests, steam challenge tests - Process Challenge Tests (PCD) and Biological tests are not done regularly as recommended due to the unavailability of test kits. This poses a risk of disposal of non-decontaminated waste to the municipal sites.

Incinerator operators should be trained on the dangers of burning waste in low temperatures and its health effects including the proper standard Operating Procedures (SOP's) for Incineration, operation and testing and validation of non-burn technologies.

Heaped waste at Mama Lucy hospital and Incinerator control panel at Nakuru PGH

7 TRAINING NEEDS ANAYSIS

The main observation is that the need for training among health workers is overwhelming and pervasive throughout all cadres and occupations. There is a chronic absence and severe backlog of routine in-service training. Without exception, health workers expressed their urgent need for training, largely due to the fact that most of them have not received specific trainings on sound chemicals management and waste and are not aware of the Global Multilateral Environmental Agreements.

Using the available channels; the training should be rolled out by the national government to the counties; sub-counties who will roll out the training at the health facility levels and provide oversight.

7.1 Sub County Health Management Team (SHMT)

The Training Needs Assessment of Sub County Health Management Teams (SCHMTs) was undertaken as integral part of a TNA conducted in preparation for the development of a Capacity Building Programme for CHMTs in Kenya. The findings listed in this section are a subset of a more extensive set of survey data, obtained through the use of FGD guide in all the four counties. The SCHMT core team consists of:

1. Sub County Medical Officer of Health
2. Sub County Public Health Officer
3. Sub County Nursing Officer
4. Sub County Health Administrator
5. Sub County Health Promotion officer

The functions of the Sub County Health Management Teams are:

- To provide expertise in health to the Sub County Government Institutions
- To coordinate and manage the implementation of health services in the sub County
- To ensure that there is regular monitoring and evaluation of the Sub County health services
- To ensure the adequacy of resources (whether material, human or financial) for the
- provision of health services in the Sub County
- To coordinate and lead the Sub County response to disease outbreaks

The following table summarises the competence gaps for the different occupations;

Managerial/Administrative staff

Occupation	Competence gaps
Managerial/Administrative	a. HCWM concepts, principles, legal framework b. HCWM planning for Health Care Facilities c. HCWM Organizational structures, roles & responsibilities & running a HCWM Committee

The Healthcare workers (clinical staff)

Occupation	Competence gaps
Doctors, Pharmacy, Laboratory, Clinical, Nursing, Dentists/COHO	a. Awareness of the multilateral Environmental Agreements (Stockholm convention, Minamata and SAICM) b. National legal and policy framework on chemicals and wastes c. HCW classification & segregation d. Environmental Health Risks & Impacts of HCW e. Chemicals management

Special Health Services Staff

Occupation	Competence gaps
Health Education Environmental Health /Occupational Health.	a. Awareness of the multilateral Environmental Agreements (Stockholm convention, Minamata and SAICM) b. HCWM concepts, principles, legal framework c. HCW classification & segregation d. Environmental Health Risks & Impacts of HCW e. HCW storage, transport, treatment and disposal f. HCWM planning for Health Care Facilities g. HCWM compliance monitoring, evaluation, enforcement h. Organizational structures, HCWM roles & i. responsibilities & running a HCWM Committee j. HCW emergency response procedures k. HCWM education and training l. HCWM awareness promotion

Non-Technical Support Staff

Occupation	Competence gaps

General Support Staff, Housekeeping (Cleaners), Mortuary attendants.	a. HCW classification & segregation b. Environmental Health Risks & Impacts of HCW c. HCW storage, transport, treatment and disposal d. HCW Emergency response procedure

Waste treatment Equipment Operators

Occupation	Competence gaps
Incinerator Operators/ Autoclave and shredder Operators; Microwave and shredder operators	a. HCW classification & segregation b. Environmental Health Risks & Impacts of HCW c. HCW storage, transport, treatment and disposal d. 4. HCW Emergency response procedure e. Standard Operating Procedures of Equipment Operation f. Daily/Weekly maintenance activities g. Common malfunction error's and solving h. Record keeping including maintenance schedule

8 TRAINING PROPOSAL

8.1 Philosophy and Rationale

Waste management requires teamwork from national government providing guidance to the counties, hospital management, health workers, sanitation officer, waste handlers and incinerator operators to ensure a working system. Therefore, all the cadres in a hospital must be trained on their specific roles in the chain of waste management. As envisaged in the WHO bluebook and National Guidelines for Safe management of Healthcare Waste; different cadres of health workers have specific roles and responsibilities in waste management and hence the different package of training.

The training needs assessment identified gaps in knowledge on standard procedures of health care waste management and lack of knowledge on chemical and other hazardous waste management requiring capacity building on the same in order to comply with global standards, international treaties and National Guidelines. While training will impart knowledge, provision of commodities and equipment for proper waste management will aid in practice of knowledge gained.

8.2 Objectives

1. Understand Kenya's global commitments of Stockholm and Minamata convention in relation to sound chemical waste management in health facilities
2. Disseminate the National guidelines and standard procedures in health care waste management
3. Create cohesion in waste management practices.

8.3 Expected Outcomes

1. Increased knowledge on sound chemicals waste management
2. Streamlined waste management practices in accordance to National guidelines and WHO blue book.

The table below summarizes the training package of the different cadres in the hospitals and duration of training;

Table 4: Proposed Training Package

Cadre	***Capacity Needs***	***Training Package***	***Training Methodology***	***Timeframe***	***No. pax***
County/Sub county teams (Nursing, PHO, IPC, Procurement Admin, lab, pharmacy, biomedical engineering.)	▪ Awareness of the multilateral Environmental Agreements (Stockholm convention, Minamata and SAICM) ▪ HCWM concepts, principles, legal framework ▪ HCW classification & segregation ▪ Environmental Health Risks & Impacts of HCW ▪ HCW storage, transport, treatment and disposal ▪ HCWM planning for Health Care Facilities ▪ HCWM compliance monitoring,	▪ Introduction to Health Care Waste management and the risks associated ▪ Principles of health Care waste management ▪ Key steps in Health Care Waste management ▪ Chemical Waste Management ▪ Waste Treatment and Disposal ▪ Occupational health and Safety ▪ Green Procurement principles Development of Facility plan/Policy	• County based trainings • Lecturing • Baseline assessment Brainstorming	***1days***	▪ 8pax/county ***32 managers***

Cadre	*Capacity Needs*	*Training Package*	*Training Methodology*	*Timeframe*	*No. pax*
Facility managers (Medsup, Nursing, PHO, IPC, Procurement Admin, lab, pharmacy, biomedical engineering.)	▪ GEF ▪ BAT/BET ▪ HCWM concepts, principles, legal framework ▪ HCWM planning for Health Care Facilities ▪ HCWM Organizational structures, roles & responsibilities & running a HCWM Committee ▪	▪ Introduction to Health Care Waste management and the risks associated ▪ Principles of health Care waste management ▪ Key steps in Health Care Waste management ▪ Chemical Waste Management ▪ Waste Treatment and Disposal ▪ Occupational health and Safety ▪ Green Procurement principles ▪ Development of Facility plan/Policy	▪ Lecturing ▪ Brainstorming ▪ Observations	▪ 4 days	▪ 4 per hospital ▪ 24/county ▪ 96 managers

Cadre	*Capacity Needs*	*Training Package*	*Training Methodology*	*Timeframe*	*No. pax*
Health Care Workers (Clinicians) Merge with Sanitation officers	▪ Awareness of the multilateral Environmental Agreements (Stockholm convention, Minamata and SAICM) ▪ National legal and policy framework on chemicals and wastes ▪ HCW classification & segregation ▪ Environmental Health Risks & Impacts of HCW ▪ Chemicals management	▪ Introduction to Health Care Waste management and the risks associated ▪ Principles of health acre waste management ▪ Key steps in Health Care Waste management ▪ Chemical Waste Management ▪ Waste Treatment and Disposal ▪ Occupational Health and Safety	▪ Baseline assessment and Brainstorming ▪ Lecturing	▪ 3 days	▪ 200
Waste handlers (Casuals and support staff)	▪ HCW classification & segregation ▪ Environmental Health Risks & Impacts of HCW ▪ HCW storage, transport, treatment and disposal	▪ Basics of Microbiology ▪ Introduction to Health Care Waste management and the risks associated ▪ Principles of health care waste management	▪ Brainstorming ▪ Lecturing ▪ Observations	▪ 1 day	▪ N/A

Cadre	*Capacity Needs*	*Training Package*	*Training Methodology*	*Timeframe*	*No. pax*
	▪ HCW Emergency response procedure	▪ Key steps in Health Care Waste management ▪ Chemical Waste Management ▪ Waste Treatment and Disposal ▪ Occupational Health and Safety			
Treatment Equipment Operators (Incinerator /Microwave/autoclave Operators)	▪ HCW classification & segregation ▪ Environmental Health Risks & Impacts of HCW ▪ HCW storage, transport, treatment and disposal ▪ HCW Emergency response procedure ▪ Standard Operating Procedures of Equipment Operation ▪ Daily/Weekly maintenance activities	▪ Introduction to Health Care Waste management and the risks associated ▪ Key steps in Health Care Waste management ▪ Chemical Waste Management ▪ Waste Treatment and Disposal ▪ Occupational Health and Safety	▪ Lecturing ▪ Observations ▪ Baseline assessment Brainstorming	▪ 2 days	▪ 39 pax

Cadre	*Capacity Needs*	*Training Package*	*Training Methodology*	*Timeframe*	*No. pax*
	▪ Common malfunction error's and solving ▪ Record keeping including maintenance schedule				

9 TRAINING IMPLEMENTATION

9.1 Plan of Action

These steps will guide the implementation of the recommendations made in this report.

Step 1. Adoption of TNA Results

The 'Training Matrices' will form the basis for updating the UPOPS Implementation Plan 2017/2018 and will be accepted by all parties as being the key reference for all 2017/18 training interventions coordinated by the MOH. The in-depth nature of this TNA, warrants that the recommendations made herein are valid for a period of up to 2 years, unless decided otherwise by the MOH and the PMU.

Step 2. Stewardship by the MOH

For the UPOPs project initiative to be sustainable, the MOH will take on the lead role for its implementation Coordination in the counties. The implementation of the training programme requires ministerial stewardship and proactive coordination. In step with the project Strategy, the Ministry, using its own human and budgetary resources, will endeavour to plan and implement further in-service training activities to the staff who will have not been inducted by the project.

Step 3. Buy-in by all Stakeholders

All Stakeholders, including Training Providers and funding agencies, will refer to the recommendations made by this TNA and endeavour to operate within its framework of training priorities.

Step 4. Training Implementation

Upon approval of the UPOPS Implementation Plan 2017/18, the MOH and UPOPs project Coordinator (MENR), will plan and coordinate concrete training interventions for 2017/18. This process will require proactive coordination by the Ministry, as well as close collaboration with all Stakeholders at the National and County levels.

10 CONCLUSION

Following the assessment and training needs analysis; capacity building on health care waste and sound chemical waste management is required in all the health facilities; at all service levels. The training will aid in streamlining the current practices which do not to comply with the National Guidelines. Incorporating a component of behaviour change and communication will aid in transforming health worker's mind-set; this featured in some facilities where majority of health workers had been trained on the required competencies but has not translated to practice.

11. OTHER RECOMMENDATIONS

1. Revise the TOT Training Guide and On Job Training Guide to include aspects on Sound Chemical Waste Management - thermal, non-thermal and POP's
2. Domesticate the Training Package Materials provided by UNDP Istanbul Region to the local context and package for each cadres to be trained by the project.
3. Include private and faith Based Hospitals in the trainings.
4. Incorporate aspects of behaviour change communication in the trainings.
5. The National Government to provide guidance to the Counties on employment of waste treatment equipment employees as skilled staff on permanent basis.
6. The Ministry of Health to liaise with Medical and Public Health Training councils of key medical training institutions – KMTC; Medical Colleges, Universities to include health Care Waste and Sound management of Chemical Waste to their curriculums.
7. Design short coursed on Sound Management of Chemical Waste in collaboration with the Public Health Officers and Technician Council (PHOTC)

11 REFERENCES

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Unintended Persistent Organic Pollutant's (UPOP's) Project Document

National Waste Management Strategy- NEMA

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Minamata Convention on Mercury: http://www.mercuryconvention.org/Portals/11/documents/conventionText/Minamata%20Convention%20on%20Mercury_e.pdf

Basel Convention: http://www.basel.int/Portals/4/Basel%20Convention/docs/text/BaselConventionText-e.pdf

WHO: Strategic Approach to International Chemicals Management (SAICM) http://www.who.int/ipcs/saicm/saicm/en/

County Government Act: file:///C:/Users/David/Downloads/CountyGovernmentsAct17of2012.pdf

Kenya National Chemical Profile: http://www.environment.go.ke/wp-content/uploads/2017/02/Kenya-Natiional-Chemicals-profile.pdf

Kenya National Implementation Plan (NIP) for Stockholm Convention on Persistent Organic Pollutants file:///C:/Users/David/Downloads/UNEP-POPS-NIP-Kenya-1.English%20(1).pdf

Kenya Health Care Waste Implementation Plan 2016 – 2021 http://documents.worldbank.org/curated/en/170601468043513782/pdf/SFG2035-EA-P152394-Box396245B-PUBLIC-Disclosed-4-13-2016.pdf

12 ANNEXTURES

Annex 1: FGD GUIDE for Facility Management

The Government of Kenya is implementing the Sound Chemicals management and waste (UPOPS) project through the Ministry of Environment and natural Resources and the Ministry of Health, funded from the Global Environment Facility (GEF). The project is conducting a training needs assessment to identify the gaps in the health sector in Mainstreaming Sound Chemicals Management and UPOPs Reduction.

Before we start, I would like to remind you that there are no right or wrong answers in this discussion. We are interested in knowing what each of you think, so please feel free to be frank and to share your point of view, regardless of whether you agree or disagree with what you hear. It is very important that we hear all your opinions.

Let's start by going around the circle and having each person introduce herself.

1. In your opinion has medical waste been managed well in this facility; If yes how? If No, why?
2. Have the facility staff been trained on waste management? If Yes, what percentage? If NO, why? why is the practice not as per national guidelines? (refer to observations made in facility walk)
3. I would like us to specifically talk about chemical waste and mercury at this stage of our discussion
    a. What are some of the chemical waste generated in this facility?
    b. How are they currently managed?
        i. Refer to observations made in the visit to laboratory (Storage, Containment, and disposal)
        ii. Are the staff aware of the different ways of managing the chemical waste? If Yes; have they been trained? If NO next quiz
4. Let us discuss about Mercury; Does the facility have mercury containing devices? If Yes List, the items if No skip
        i. Are staff sensitized on management of mercury waste? i.e from broken bulbs, mercury thermometers; BP machines?
        ii. Does the facility have separate stream for management and storage of mercury waste?

iii. Does this facility have plans for disposal of mercury waste?

5. Let us discuss about radiology department;
    a. What kind of machines do we use (if seen during the visit no need to ask)?
    b. How do we manage waste from radiology department (if using film)?
6. Dental Department;
    a. Use of Amalgam/composite
    b. Disposal of Amalgam
7. How does the facility manage expired pharmaceutical drugs?
8. Have they been vaccinated against Hepatitis B?
9. Any other comments on the topic?

Annex 2: Health Worker Structured Questionnaire

HEALTH WORKER QUESTIONAIRE

HEALTH FACLITY NAME_____

NAME OF HEALTH WORKER_____

DEPARTMENT_____

INTRODUCTION

The Government of Kenya is implementing the Sound Chemicals management and waste (UPOPS) project through the Ministry of Environment and natural Resources and the Ministry of Health, funded from the Global Environment Facility (GEF). The project is conducting a training needs assessment to identify the gaps in the health sector in Mainstreaming Sound Chemicals Management and UPOPs Reduction.

CONFIDENTIALITY

Kindly understand that the responses are confidential and will not be used anywhere else apart from supporting the project team design a tailored training to the different health workers.

Shall we continue? YES (Proceed)_____ NO_____ (End)

	Tick where applicable	*Comments*
1. How long have you been working in this hospital?	a) 0- 2 years b) 3-5 years c) 5-7 years d) 7- 10 years	
2. What kind of waste is generated in your department?	a) Infectious waste b) Non- Infectious Waste c) Pathological waste d) Chemical waste e) Mercury waste	
3. Do you have colour coded bins in the department for waste segregation?	a) Yes b) No	
4. In your department do you have matching colour coded liners?	a) Yes b) No	
5. Do you have regular supply of liners and safety boxes for management of waste?	a) Yes b) No	

	Tick where applicable	*Comments*
6. Have you been trained on management of health care waste including chemical waste?	a) Yes b) No	
7. If yes above When was that?	(Record response) _____	
8. The training was conducted by who?	a) PATH b) JHPIEGO c) National Government d) In-house training	
9. What were you trained on?	a) Laws and regulations on waste management b) Waste Minimization c) Waste segregation d) Handling and storage of waste e) Waste transportation f) Chemical waste management g) Equipment disinfection	
10. Do you understand the Unintended Organic pollutants 9UPOP's that are generated in the health sector in Kenya	a) Yes b) No	
11. Have you ever heard about the Stockholm conventions?	a) Yes b) No	
12. What kind of decontaminants do you use for equipment?	a) Hypochlorite (Jik) b) Cidex c) Enzymatic decontaminants d) Protein fixing Decontaminants	
13. What detergents do you use for surface disinfection?	a) Tablets b) Jik c) Cleaning detergents (Omo)	
14. How do you dispose off waste water from cleaning and equipment disinfection?	a) Through the drainage system b) Dispose of in field outside the hospital	

	Tick where applicable	*Comments*
	c) To the soak pit	
15. Have you been vaccinated against Hepatitis B	a) Yes; How many times _____ b) NO	
16. Do you have mercury containing devices in this department?	a) YES (List)_____ b) NO	
17. What do you do when you have a broken bulb in your department?	a) Sweep off and dispose in a black bin b) Wear gloves and pick up the pieces c) Call the department cleaner to clean up d) Cordon the area and Reach for mercury spill kit and clean the area as per instructions	

Annex 3: Waste Handler Questionnaire

WASTE HANDLER

HEALTH FACLITY NAME_____

NAME OF WASTE HANDLER_____

DEPARTMENT_____

INTRODUCTION

The Government of Kenya is implementing the Sound Chemicals management and waste (UPOPS) project through the Ministry of Environment and natural Resources and the Ministry of Health, funded from the Global Environment Facility (GEF). The project is conducting a training needs assessment to identify the gaps in the health sector in Mainstreaming Sound Chemicals Management and UPOPs Reduction.

CONFIDENTIALITY

Kindly understand that the responses are confidential and will not be used anywhere else apart from supporting the project team design a tailored training to the different health workers.

Shall we continue? YES (Proceed)_____ NO_____ (End)

	Tick where applicable	Comments
How long have you been working in this hospital?	a. 2 years b) 3-5 years c) 5-7 years d) 7- 10 years	
What kind of waste is generated in your department?	a) Infectious waste b) Non- Infectious Waste c) Pathological waste d) Chemical waste e) Mercury waste f) Sharps waste	

	Tick where applicable	Comments
Do you have colour coded bins in the department for waste segregation?	a) Yes b) No	
In your department do you have matching colour coded liners?	a) Yes b) No	
Do you have regular supply of liners and safety boxes for management of waste?	a) Yes b) No	
Have you been trained on management of health care waste including chemical waste?	a) Yes b) No	
If yes above When was that?	(Record response) _____	
The training was conducted by who?	a) PATH b) JHPIEGO c) National Government d) In-house training	
If Yes above; What were you trained on?	a) Laws and regulations on waste management b) Waste Minimization c) Waste segregation d) Handling and storage of waste e) Waste transportation f) Chemical waste management g) Equipment disinfection	
What kind of decontaminants do you use for equipment?	a) Hypochlorite (Jik) b) Cidex c) Enzymatic decontaminants d) Protein fixing Decontaminants	
What detergents do you use for surface disinfection?	a) Tablets b) Jiko	

	Tick where applicable	Comments
	c) Cleaning detergents (Omo)	
How do you dispose off waste water from cleaning and equipment disinfection?	a) Through the drainage system b) Dispose of in field outside the hospital c) To the soak pit	
Have you been vaccinated against Hepatitis B	a) Yes; How many times _____ b) NO	
What do you do when you have a broken bulb in your department?	a) Sweep off and dispose in a black bin b) Wear gloves and pick up the pieces c) Call the department cleaner to clean up d) Cordon the area and Reach for mercury spill kit and clean the area as per instructions	
What do you do when you get a needle stick injury?	a) Wash in running water and cover with Elastoplast b) Squeeze and wrap with gauze c) Wash in running water without squeezing and report to supervisor d) Suck the blood and once bleeding stops tell my supervisor e) Wrap immediately and leave work	

Annex 4: Incinerator Operator Questionnaire

INCINERATOR OPERATOR QUESTIONNAIRE.

HEALTH FACLITY NAME_____

NAME OF INCINERATOR/AUTOCLAVE OPERATOR_____

INTRODUCTION

The Government of Kenya is implementing the Sound Chemicals management and waste (UPOPS) project through the Ministry of Environment and natural Resources and the Ministry of Health, funded from the Global Environment Facility (GEF). The project is conducting a training needs assessment to identify the gaps in the health sector in Mainstreaming Sound Chemicals Management and UPOPs Reduction.

CONFIDENTIALITY

Kindly understand that the responses are confidential and will not be used anywhere else apart from supporting the project team design a tailored training for waste treatment operators.

Shall we continue? YES (Proceed)_____ NO_____ (End)

	Tick where applicable	*Comments*
1. How long have you been working in this hospital?	a) 0- 2 years b) 3-5 years c) 5-7 years d) 7- 10 years	
2. What kind of waste do you manage at the treatment site?	a) Infectious waste b) Non- Infectious Waste c) Pathological waste d) Chemical waste e) Mercury waste f) Pharmaceutical waste	
3. Do you keep records of waste brought to you for treatment? (Ask to see)	a) Yes b) No	
4. What kind of treatment equipment do you have?	c) Incinerator d) Autoclave and Shredder	

	e) Burning Chamber f) None (Open Burning)	
5. Have you been trained on management of health care waste?	c) Yes d) No	
6. Have you been trained on how to operate the Incinerator/Autoclave?	c) Yes d) No	
7. If Incinerator above; what temperatures does it operate in Primary and Secondary chamber	a) 500 and 800 respectively b) 850 and 1000 respectively c) 900 and 1000 respectively d) Don't know	
8. If Autoclave; what is the sterilization time for decontamination	a) 15 – 20 minutes b) 20 – 30 minutes c) 30 – 40 minutes d) Over 45minutes	
9. Do u carry out testing of your loads ?	a) Yes b) No	
10. What kind of teats do you conduct	a) Chemical testing b) PCD testing c) Biological testing d) Steam tests e) Thermoelectric Tests	
11. Do you keep records on the tests?	a) Yes b) No	
12. Do you have PPE's for handling and treating waste?	a) Yes b) No	
13. Are they adequate 14. (*Helmet, Respirator, googles, overall, apron, safety boots, heat resistant and rubber gloves)*	a) Yes b) No	
15. Do you understand the health effects of burning waste in low temperatures including open burning?	a) Yes (Which ones) _____ b) No	

16. Have you been vaccinated against Hepatitis B	a) Yes; How many times _____ b) NO	
17. Do you receive mercury containing devices in?	a) YES (List)_____ b) No c) Not sure	
18. What do you do when you have a broken bulb in waste you received?	a) Incinerate with other wastes b) Dispose in a pit c) Autoclave with other wastes d) Other (Specify) _____	
19. Do you sometimes receive waste including chemicals from the laboratory	a) Yes b) No	
20. What do you do with the chemical waste?	a) Pour to the drainage b) Incinerate with other wastes c) Dispose in a pit d) Autoclave with other wastes e) Other (Specify) _____	
21. How do you treat pharmaceutal waste from pharmacy	f) Incinerate with other wastes	